Current Radiation Safety Issues

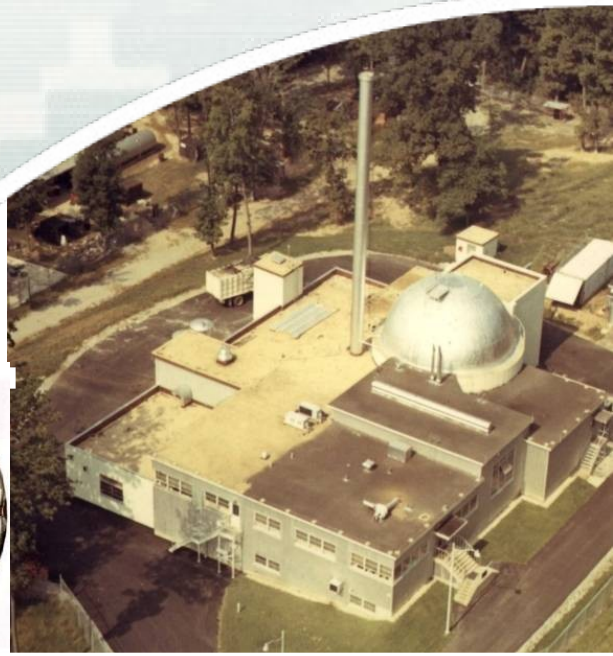
Presenter

Julie A. Clements, CHP

EM CX, US Army Corps of Engineers

11 May 2010

USACE SOH Conference, St. Louis, MO



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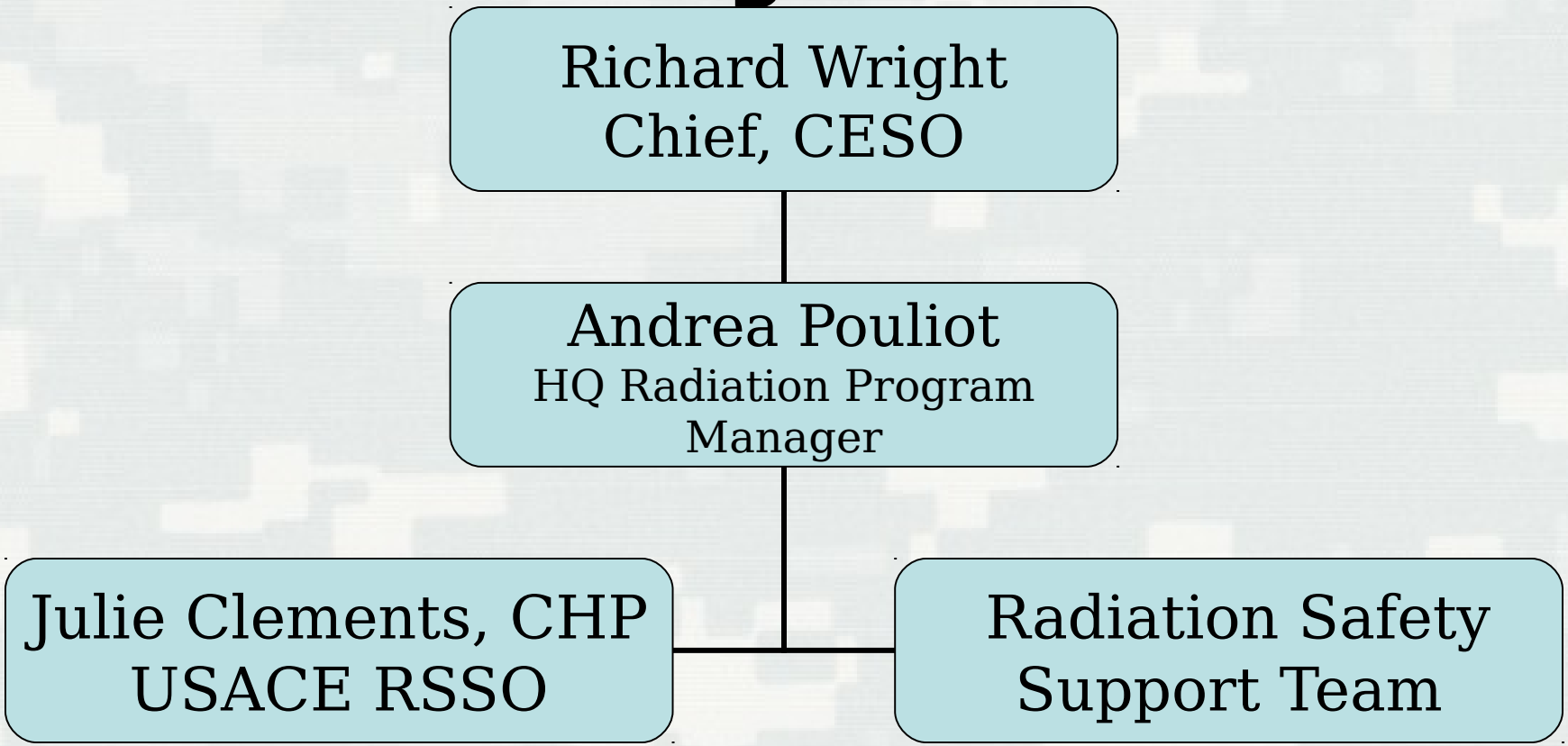
Topics

- USACE Radiation Protection Program
  - Documentation and organization
- Radiation Safety Support Team
  - What it is
  - What it does
- Army Radon Reduction Program
- Tritium Exit Signs
- RSO Resources

USACE Radiation Protection Program

- ER 385-1-80, Ionizing Radiation Protection
  - Slight changes to dosimetry reporting
  - Removed PSE's
  - Clarified tiered dose limits, information flow
  - Overall – cleaned it up
- EM 385-1-80, Radiation Protection Manual
  - Draft for peer review by end of FY
- AR 385-10, The Army Safety Program
- Mandatory DA PAM 385-24, The Army Radiation Safety Program

USACE Radiation Protection Program



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Radiation Safety Support Team

- Established by the USACE Chief of Staff in December 1997
- The RSST consists of health physicists in NAB, LRB, MVS and NWK and the EMCX
- The RSST is coordinated at the EMCX and the POC is Julie Clements, CHP
- The HQUSACE Radiation Program Manager, Andrea Pouliot, is responsible for RSST oversight

RSST Supported Activities

- Radiation Surveys and Site Investigation
  - Design, oversee, and/or perform surveys during all phases of site investigation and restoration
- Radioactive Waste Transportation and Disposal
  - Profiling, packaging, and transporting

RSST Supported Activities

- Radiation Risk/Dose Modeling
  - RESRAD/RESRAD BUILD
- Nuclear Reactor Decommissioning
- Radiation Protection Training

- Audits of USACE licensees/ARA holders
  - Required by DA PAM 385-24 and ER 385-1-80
  - Performed triennially
  - Conducted by an RSST member

Radon – ARRP Background

- Subchapter III of TSCA, Indoor Radon Abatement Act (1988)
  - Required the head of each federal agency to design a study to assess the extent of radon contamination in buildings
  - A centralized testing program was initiated
- AR 200-1, Environmental Protection and Enhancement (1990)
  - Chapter 11, Army Radon Reduction Program

Radon – ARRP Background

- AR 200-1 revised (2007), ARRP removed
- AR 420-1, Army Facilities Management (2007)
  - Defines radon
  - Requires that each installation establish a radon assessment and mitigation program
  - Refers to AR 200-1
    - For additional info on measurements, relative risk, action levels, and mitigation techniques

Radon - PWTB

- PWTB 420-1-XX, Installation Toxics Planning
- Covers lead, asbestos, PCB's, and radon (Appendix D)
- Purpose – provide guidance on how to detect, evaluate, control or remove subject toxic materials
- Applicability – Army owned or leased or otherwise controlled structures

Radon - PWTB

- Prioritizes structures
  - Priority 1 = day care centers, hospitals, schools and living areas (4 pCi/L)
  - Priority 2 = areas having 24 operations (30 pCi/L)
  - Priority 3 = all other routine occupied structures (30 pCi/L)
- Details for testing in installation plans
  - Program is decentralized
- Establishes timelines for remediation

Radon Standards

- US EPA - action level
  - 4 pCi/L for lived-in areas of residences
  - Serves as the basis for Priority 1 standard
- OSHA – 29 CFR 1910.1096
  - 100 pCi/L averaged over a 40 hr work wk
- US NRC – 10 CFR 20
  - Derived air concentration < 30 pCi/L
  - Serves as the basis for Priority 2/3 standard plus ALARA

Tritium Exit Signs: Basics

- Glass tubes internally coated with phosphor and containing tritium (H-3) gas
- Typically contain 10 to 20 Ci of H-3
- Several different manufacturers
- Cheap and reliable if not mishandled
- Breakage is common in certain settings (e.g., school gym, around a forklift operation, or where a sign near the floor is required)

Intact Exit Signs

SRB Technologies

Isolite

Regulatory Background

- US NRC Regulations
  - 10 CFR 31
  - 10 CFR 32
- US NRC Guidance
  - NUREG-1556
- DOD Unified Facilities Criteria
  - UFC 3-600-01

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10 CFR 31: General Domestic Licenses for Byproduct Material

- Relevant language found in §31.5
- General licensees who possess TES must:
  - Appoint an individual responsible for ensuring compliance with the requirements
  - Ensure that labels are intact
  - Suspend operation of broken signs

10 CFR 31 (cont.)

- General licensees who possess TES must:
  - Return unwanted or broken signs to a specific licensee authorized to receive them (typically a manufacturer)
  - Report lost, stolen or transferred signs to the appropriate regulatory agency within 30 days

10 CFR 32: Specific Domestic Licenses to Manufacture or Transfer Certain Items Containing Byproduct Material

- Relevant language found in §32.51a
- Manufacturers of TES must provide information to the general licensee receiving the signs, to include:
  - A copy of the requirements pertaining to a general licensee

10 CFR 32 (cont.)

- Manufacturers must provide:
  - A list of services that can only be performed by a specific licensee
  - Information on acceptable disposal options
  - A reminder that NRC can issue penalties for improper disposal

NUREG-1556: Consolidated Guidance for Materials Licensees

- Volume 16, Appendix G: Guidance on Self Luminous Exit Signs
- Question and answer format, reiterates the requirements of 10 CFR 31.5
- Expands on key issues such as how to make the required reports, how to determine if a sign is functional, and what to do if a sign is broken to minimize the spread of contamination

UFC 3-600-01

UNIFIED FACILITIES CRITERIA (UFC)

FIRE PROTECTION ENGINEERING FOR FACILITIES

APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED

UFC 3-600-01
26 September 2006
Change 1, 14 July 2009

CHAPTER 1 INTRODUCTION

1-1 SCOPE.

This UFC establishes fire protection engineering policy and criteria for Department of Defense (DOD) components. The provisions of this UFC are applicable to all new and existing DOD facilities located on or outside of DOD installations, whether acquired or leased, by appropriated or non-appropriated funds, or third party financed and constructed. Facilities covered by this document include all types of buildings and their contents, structures, whether considered temporary or permanent, mobile and stationary equipment, waterfront facilities, outside storage, and shore protection for ships and aircraft. Matters relating to fire department operations, staffing, and equipment are not covered by this UFC.

1-2 PURPOSE

The purpose of this UFC is to establish minimum protection requirements for DOD facilities. These criteria are based on commercial requirements set forth by national insurance underwriters and may exceed minimum national code requirements. The requirements in this UFC reflect the need for the protection of life, mission, and property (building or contents) while taking into account the costs of implementing the criterion and risks associated with the facility. These criteria have been established in the best interest of DOD.

1-2.1 Document Development

This document is intended to be used as a basis for the development of detailed design documents (including scope, basis of design, technical requirements, plans, drawings, specifications, cost estimates, request for proposals, and invitations for bids) used for the procurement of facilities, facility similar equipment, and other shore/land based infrastructure systems. It must be used as a reference document and requirement in the procurement of architectural and engineering services (A&E) and other consulting services to prepare detailed design documents including those for design/build projects. It is not intended to be used in lieu of detailed design documents in the procurement of facility construction.

1-3 CRITERIA

This UFC implements the following public laws:

a. UNITED STATES CODE
http://www.gpoaccess.gov/uscode/index.html

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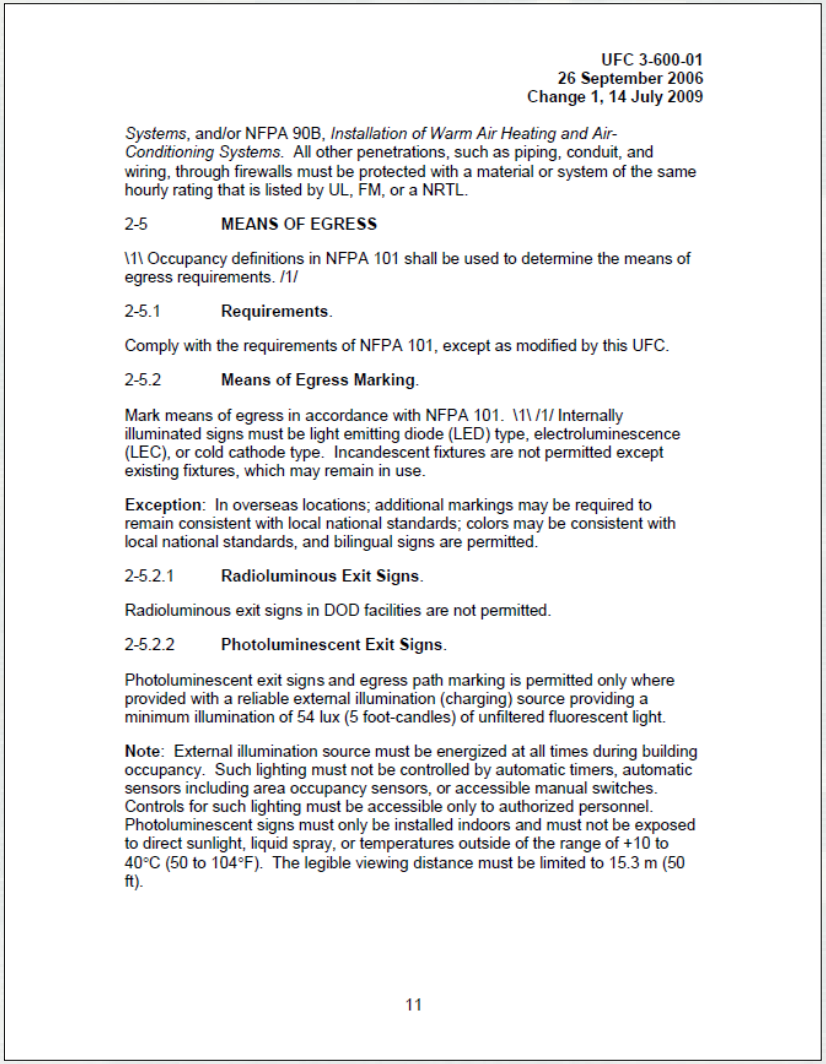

UFC 3-600-01
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Systems, and/or NFPA 90B, *Installation of Warm Air Heating and Air-Conditioning Systems*. All other penetrations, such as piping, conduit, and wiring, through firewalls must be protected with a material or system of the same hourly rating that is listed by UL, FM, or a NRTL.

2-5 **MEANS OF EGRESS**

\1\ Occupancy definitions in NFPA 101 shall be used to determine the means of egress requirements. /1/

2-5.1 **Requirements**.

Comply with the requirements of NFPA 101, except as modified by this UFC.

2-5.2 **Means of Egress Marking**.

Mark means of egress in accordance with NFPA 101. \1\ /1/ Internally illuminated signs must be light emitting diode (LED) type, electroluminescence (LEC), or cold cathode type. Incandescent fixtures are not permitted except existing fixtures, which may remain in use.

Exception: In overseas locations; additional markings may be required to remain consistent with local national standards; colors may be consistent with local national standards, and bilingual signs are permitted.

2-5.2.1 **Radioluminous Exit Signs**.

Radioluminous exit signs in DOD facilities are not permitted.

2-5.2.2 **Photoluminescent Exit Signs**.

Photoluminescent exit signs and egress path marking is permitted only where provided with a reliable external illumination (charging) source providing a minimum illumination of 54 lux (5 foot-candles) of unfiltered fluorescent light.

Note: External illumination source must be energized at all times during building occupancy. Such lighting must not be controlled by automatic timers, automatic sensors including area occupancy sensors, or accessible manual switches. Controls for such lighting must be accessible only to authorized personnel. Photoluminescent signs must only be installed indoors and must not be exposed to direct sunlight, liquid spray, or temperatures outside of the range of +10 to 40°C (50 to 104°F). The legible viewing distance must be limited to 15.3 m (50 ft).

11

"This does not effect existing facilities."

Robert M. DiAngelo, P.E.
Fire Protection Engineer
Headquarters, USACE
CECW-CE

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UFC 3-600-01

- AR 420-1, Section VIII, Fire Protection Engineering
  - “New construction, renovations and modernization projects will comply with UFC 3–600–01, Fire Protection Engineering for Facilities. For repair projects, only the new work is required to comply with the requirements for new construction. As a minimum, existing buildings will comply with the requirements of NFPA 101, Life Safety Code.”

Problems Encountered

- Possessors of TES are often unaware of the requirements
- Responsible person may not be identified especially when new ownership occurs
- TES are often mishandled when broken
- EPA concerns regarding tritium leachate in landfills pointed to TES disposal as the problem

Broken Sign (slight damage)

Broken Sign (moderate damage)

Broken Sign (severe damage)

Resources

- EPA on-line training course
  - Responsible Management of H-3 EXIT Signs
  - www.trainex.org
- EM CX web site
  - www.environmental.usace.army.mil
- Integrated Environmental Management
  - www.iem-inc.com
- NUREG-1556 undergoing a 3 yr review and update process (complete June 2013)

EM CX Home - Windows Internet Explorer

http://www.environmental.usace.army.mil/

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You are at the Environmental and Munitions Center of Expertise (EM CX) Web Site. The U.S. Army Corps of Engineers (USACE) remediates properties contaminated with hazardous waste, radioactive materials, and/or ordnance in compliance with federal, state and local laws and regulations striving for sustainability while meeting the current as well as future needs, safeguarding human health and safety, improving quality of life, and enhancing the natural environment. USACE supports military and civil agencies nationwide in environmental and munitions responses.

POC: Webmaster
Related Links: Hq Environmental Community of Practice, HQ Corps of Engineers
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Technical Disciplines
Health Physicists
Health Physics (HP) staff at the EM CX provides expertise in the areas of occupational radiation safety, environmental cleanup, radioactive waste disposal, radon measurements and mitigation, radiation source management, and radiation risk assessment. The HP staff serves all USACE programs and missions by providing project specific technical assistance, developing user-friendly guidance, teaching formal and informal training courses/workshops, and representing USACE at various meetings/conferences. We also manage and coordinate use of the Radiation Safety Support Team (RSST) for USACE mission activities.
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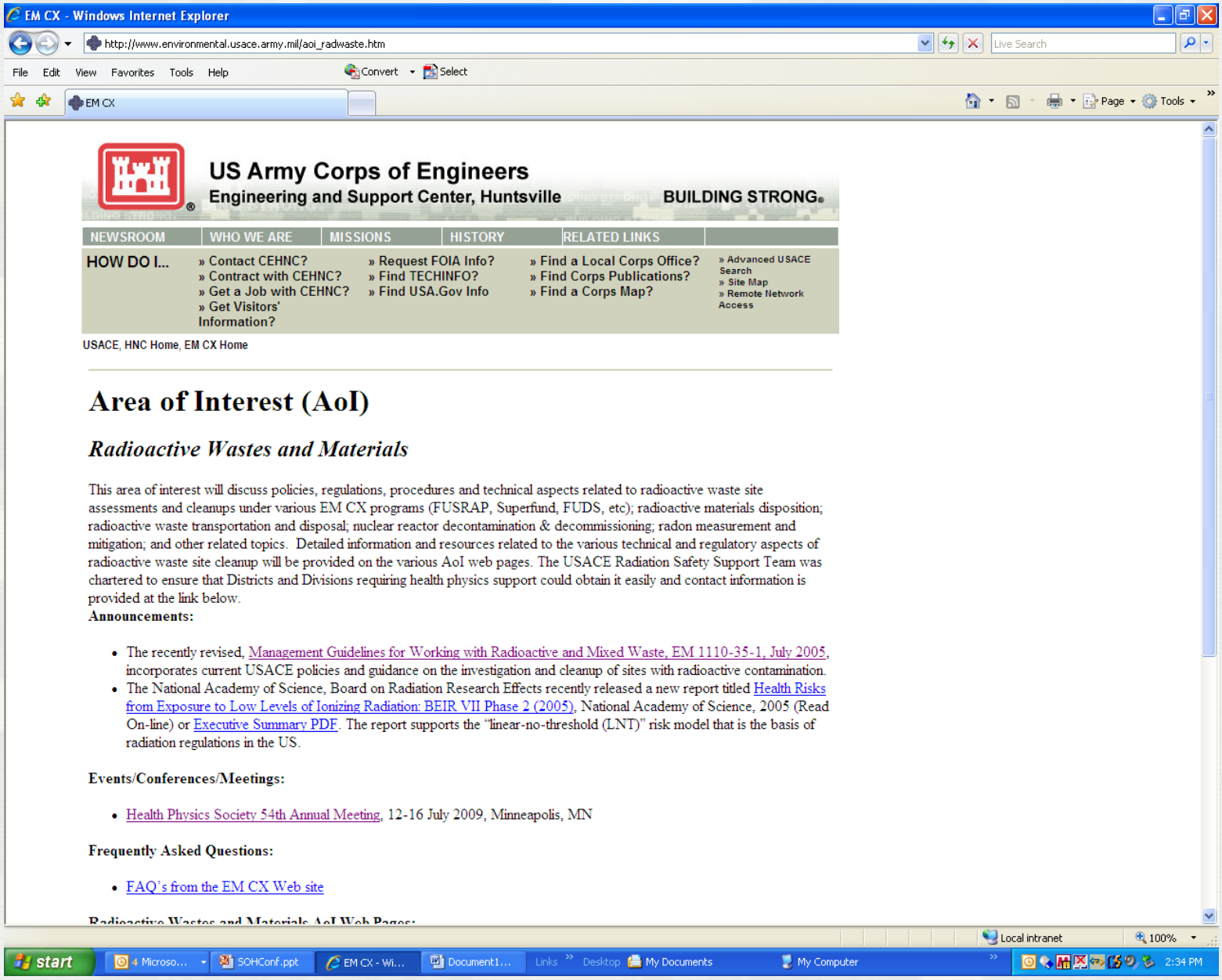
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Area of Interest (AoI)
Radioactive Wastes and Materials
This area of interest will discuss policies, regulations, procedures and technical aspects related to radioactive waste site assessments and cleanups under various EM CX programs (FUSRAP, Superfund, FUDS, etc); radioactive materials disposition; radioactive waste transportation and disposal; nuclear reactor decontamination & decommissioning; radon measurement and mitigation; and other related topics. Detailed information and resources related to the various technical and regulatory aspects of radioactive waste site cleanup will be provided on the various AoI web pages. The USACE Radiation Safety Support Team was chartered to ensure that Districts and Divisions requiring health physics support could obtain it easily and contact information is provided at the link below.
Announcements:
The recently revised, Management Guidelines for Working with Radioactive and Mixed Waste, EM 1110-35-1, July 2005, incorporates current USACE policies and guidance on the investigation and cleanup of sites with radioactive contamination.
The National Academy of Science, Board on Radiation Research Effects recently released a new report titled Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2 (2005), National Academy of Science, 2005 (Read On-line) or Executive Summary PDF. The report supports the "linear-no-threshold (LNT)" risk model that is the basis of radiation regulations in the US.
Events/Conferences/Meetings:
Health Physics Society 54th Annual Meeting, 12-16 July 2009, Minneapolis, MN
Frequently Asked Questions:
FAQ's from the EM CX Web site
Radioactive Wastes and Materials AoI Web Pages:
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Important News pertaining to radiation and radioactivity - IEM - Windows Internet Explorer

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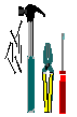

Tool Box

The Integrated Environmental Management, Inc. (IEM) "tool box" contains some handy items that might be of use to you. In the tool box is a glossary of important ionizing and non-ionizing radiation terms, some ways to convert common units you might encounter, a list and definition of some prefixes that often appear in discussions and papers about radioactivity, listings of some common radiation sources and exposures (consumer products and others), a reference list of additional sources of information on specific radiation protection topics, the densities of some common materials, a brief listing of the characteristics of radiation detection instruments, a listing of the specific activity and federally-exempt quantities (and concentrations) of a host of radionuclides, some dose conversion factors, and a series of federal agency position papers on radiation safety topics.

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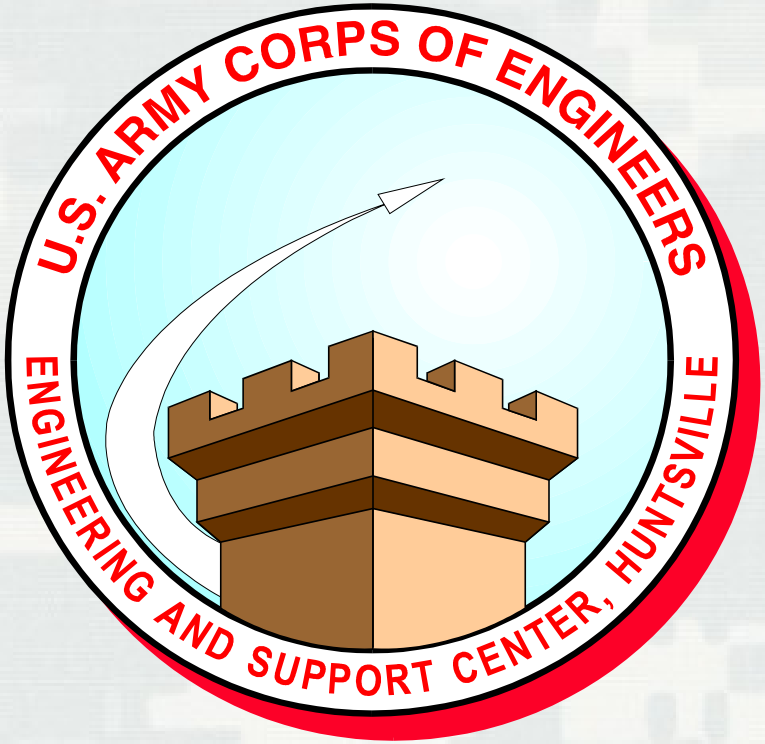
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